



Disposal and diversion findings for industry groups

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This is the third in a series of articles discussing the *Targeted Statewide Waste Characterization Study*, published by the California Integrated Waste Management Board (CIWMB) in 2006. This complex study includes detailed characterization and quantification of the following distinct waste streams:

- Disposal and diversion for selected industry groups.
- Residuals from materials recovery facilities (MRF).
- Disposal from construction and demolition (C&D) activities.
- Disposal from the commercial self-haul and loose drop-box sector.

In the Summer 2006 Edition of *infoCycling* we discussed the C&D portion of the study. In the Fall 2006 Edition, we discussed the evaluation of MRF residuals. This article presents the results of the study on selected industry groups. A subsequent edition of *infoCycling* will contain an article regarding the self-haul and loose drop-box portion of the study.

The study quantified and characterized materials that are disposed as well as recycled or otherwise diverted by key types of commercial establishments. The study represents the largest effort conducted in the United States thus far to provide an understanding of waste disposal and diversion practices simultaneously for major industry groups. The CIWMB conducted a study on industry groups in 1999 that characterized disposed waste only. The results of the present study provide a complete picture of waste management practices that are typical of the targeted industry groups.

The 14 industry groups that were targeted are listed below and on page 2:

- Fast-food restaurants.
- Full-service restaurants.
- Food stores.
- Durable wholesale goods distributors (for example, warehouses and distributors of non-perishable items).

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- Non-durable wholesale goods distributors (for example, food warehouses and distributors).
- Large hotels.
- Building material and garden stores belonging to certain "big box" chains.
- Other building material and garden stores.
- Retail stores belonging to certain "big box" chains.
- Other retail stores.
- Shopping malls.
- Anchor stores at shopping malls.
- Public venues and events.
- Large office buildings.

A total of 371 businesses were used in the study, with 20 to 35 sites used in each industry group. All sites were located in the major urban areas of the state—the San Diego, Los Angeles, San Francisco, and Sacramento metropolitan areas. Data was collected in 2005. Sites were visited and interviewed to gather information on the types of materials diverted, amounts of materials diverted and disposed,

and business characteristics such as number of employees or size in square footage. Samples of waste from the dumpster(s) of each business were collected and sorted.

Results include amounts of materials typically disposed, diverted, and generated by each industry group as shown in the chart on page 3 for some of the 14 groups studied.

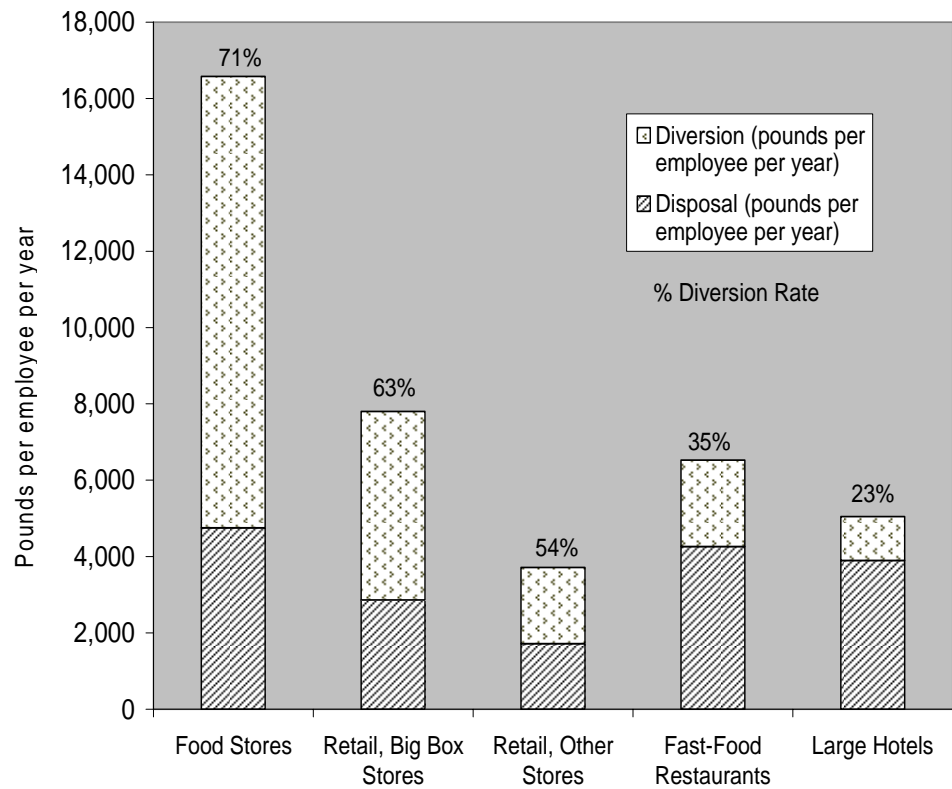
The disposal amount (lower part of bars) plus the diversion amount (upper part of bars) equals the total generation amount. Food stores typically generate a lot of waste (more than 16,000 pounds per employee), but they divert more than 70 percent of it, mostly through cardboard recycling.

Results also include composition of materials disposed and diverted. Data for retail stores (other than "big box" stores) is shown in the table on page 3. For example, of all the materials disposed by retail stores, 31.8 percent is paper. Of all the materials diverted, 91.0 percent is paper (mostly cardboard), and 63.6 percent of materials generated is made up of paper.

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Disposal and diversion findings for industry groups, continued from page 2

Disposal and Diversion Amounts for Selected Industry Groups, 2005



Waste Composition for Retail Stores (other than big box stores)

Material Category	Percent of Disposed Waste	Percent of Diverted Waste	Percent of Generated Waste
Paper	31.8	91.0	63.6
Glass	6.2	0.2	3.0
Metal	8.7	0.3	4.2
Plastic	14.4	0.9	7.1
Electronics	0.7	0.0	0.3
Organics	17.5	0.0	8.1
Construction/Demo.	15.0	7.5	11.0
Household Hazard.	0.1	0.0	0.1
Special Waste	5.4	0.0	2.5
Mixed Residue	0.2	0.0	0.1

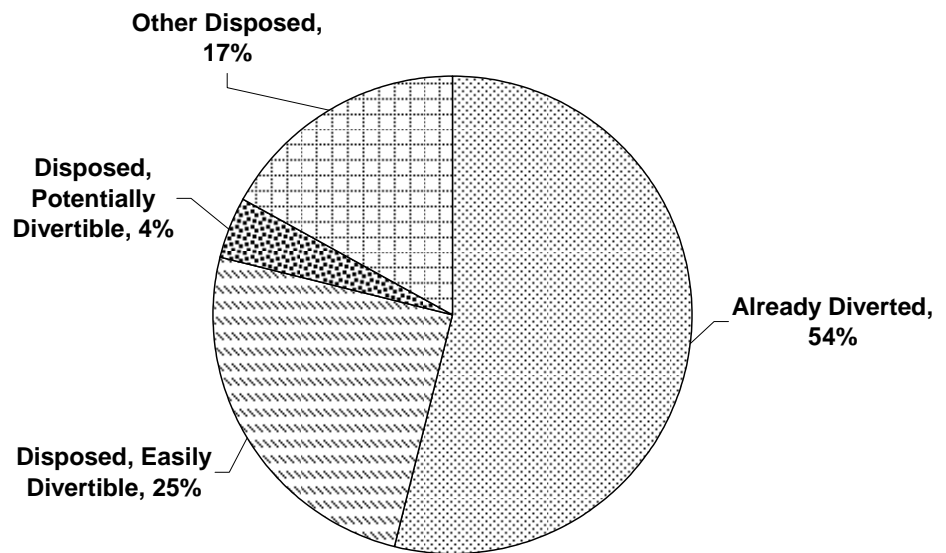
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Disposal and diversion findings for industry groups, continued from page 3

Using information on the types of materials in each category that are diverted and what is still being disposed; we can make a general assessment of potential for further

diversion from each business type. This is shown for retail stores (other than big box stores) in the pie chart below.

Diversion Potential for Retail Stores (other than big box stores)



What businesses can help you increase diversion?

Overall the study showed that many industry groups are diverting significant amounts of the materials they generate, but there is still a lot of potential to divert more. The material diverted in the largest amounts is cardboard, but some businesses could still capture more of it for recycling.

Compostable materials such as food, yard waste, and some types of paper present a key opportunity to significantly increase diversion from some business types. For other businesses, recycling more paper, pallets, and other readily recyclable materials like plastic

containers and metal would increase their diversion rates.

Where do I get more information?

For more information on the *Targeted Statewide Waste Characterization Study: Waste Disposal and Diversion Findings for Selected Industry Groups*, contact Nancy Carr at (916) 341-6216 or ncarr@ciwmb.ca.gov. Or, contact Tom Rudy at (916) 341-6229 or trudy@ciwmb.ca.gov.

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The report, which contains full composition tables as well as other information for each type of industry group, can be found in

the CIWMB publication catalog at www.ciwmb.ca.gov/Publications/default.asp?pubid=1184.

CIWMB funds research on turning organics into energy and compost.

Organic waste fuels University of California Davis power plant

The Biogas Energy Plant officially started up at University of California, Davis (UC Davis) on October 24, 2006.

The Biogas Energy Plant tests and brings to market an advanced anaerobic digestion technology that focuses on organic waste recovery and conversion for the production of biogas fuels and bio-based products. The anaerobic digester can literally turn organic waste into energy and compost.

This plant is part of a Biogas Energy Project developed between the UC Davis campus and Onsite Power Systems, Inc., a bio-energy company. Dr. Ruihong Zhang and her students at UC Davis created the Anaerobic Phased Solids Digester (APS-Digester) technology.

In 1999, Onsite Power Systems, Inc. began the commercialization process. Since then, the bio-energy company funded and constructed two scaled-up APS-Digester Systems while working in close partnership with Dr. Zhang and her research team.

California Integrated Waste Management Board signs research contract with UC Davis

The California Integrated Waste Management Board (CIWMB) entered into a research contract with UC Davis to expand the CIWMB's knowledge of anaerobic digestion technology. Specifically, the CIWMB is interested in the performance of the APS-Digester at UC Davis.

The digester uses a mix of municipally derived materials and/or organic materials recovery facility (MRF) residuals destined for landfilling. In addition, UC Davis researchers will be evaluating the performance of the digester using UC Davis campus waste (food and green waste, animal bedding, and dairy manure).

Municipally derived material is organic waste that originates from the municipal waste stream (food waste, grass clippings, leaves, tree prunings, paper, etc.) as opposed to agricultural or forest waste. Organic MRF residual is material left at the end of the sorting line and consists mostly of food and

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Organic waste fuels UC Davis power plant, continued from page 5

mixed paper waste that is destined for landfilling. UC Davis researchers are working with a municipal waste collection company in Northern California to characterize the organic fraction of municipal solid waste to gain the knowledge and understanding of the waste characteristics relevant to anaerobic digestion processes.

Chemical analyses will be performed on these waste streams for moisture content, total solids, volatile solids, nutrients (nitrogen, phosphorus, potassium, etc.), carbon to nitrogen ratio (C/N), salts, and metals. Laboratory batch anaerobic digestion tests will be performed to determine the biogas and methane yields of these wastes. All the digestion tests will be performed at a thermophilic temperature of 55–58°C (131 °F – 136.4 °F).

Laboratory test results will be used to design the best strategies in preparing such waste streams as feedstock for the pilot scale tests with the APS-Digester System. Feedstock preparation trials will be conducted to determine the requirements for preparing different waste streams, such as size reduction and mixing, prior to loading into the digester.

Using the results of the laboratory tests and feedstock preparation trials, UC Davis will conduct pilot tests of the APS-Digester to analyze the performance of the APS-Digester system and the characteristics of the digestate (Anaerobic digestion reduces organic waste by converting it into

a relatively stable solid and liquid residue called digestate).

The analysis will include:

- Quality and quantity of biogas (including concentration of methane) produced per given quantity of feedstock.
- Residence time of feedstock in the APS-Digester.
- Performance and other physical parameters (temperature, energy, pressure, etc.) of the APS-Digester.
- Reduction in solids volume and pathogens.
- Nutrient and microbial characteristics of both solids and liquid (nutrient, pathogen, metals, etc.).
- Biological stability of solids digestate and determination of further requirements for post-composting if necessary.

UC Davis will write a final report. The report will describe the anaerobic digestion technology, test methodology, assumptions, data, and results; and it will provide recommendations for further research.

What are the benefits of this renewable energy?

UC Davis estimated that the digester will consume about 3 tons of organic waste per day. The organic waste is being delivered from collection centers. In turn, 600 kilowatt-hours of electricity

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Organic waste fuels UC Davis power plant, continued from page 6

will be generated daily. This is enough energy for 25 standard California homes. Organics make up about a third of the waste stream going to landfills, and food is the most prevalent material at 15 percent of the waste stream. In addition to energy production, this technology could divert a significant amount of material from landfilling.

Contact information

For more information about the new UC Davis Biogas Energy Plant, contact Dr. Ruihong Zhang, U.C. Davis, at (530) 754-9530 or rhzhang@ucdavis.edu. Or, contact Steve Storelli, CIWMB, at (916) 341-6584 or sstorell@ciwmb.ca.gov.

Nothing in the article is intended to be an endorsement of a particular company or process by the CIWMB.

Updated statutes

The California Integrated Waste Management Board (CIWMB) has updated laws relating to integrated waste management. The updated laws (statutes) include all waste-related statutes that are in effect as of January 2007. Statutes are available at www.ciwmb.ca.gov/Publications/Law/54007001.pdf.

Have you received an award?

Have you received an award for reducing, reusing, recycling, or composting waste that you would like to highlight in a future edition of *infoCycling*? If so, contact Tracy Webb at twebb@ciwmb.ca.gov or (916) 341-6240.

Did you know?

California specifics

- California is a unique state in many ways including its large geographic size and its dynamic and diverse population.
- According to the Department of Finance 2005 *California Statistical Abstract*, page 9 (www.dof.ca.gov/HTML/FS_DATA/STAT-ABS/StatAbs05_web4.pdf), California covers 163,696 square miles between the 32nd and 42nd parallels north latitude on the Pacific Coast. The state has 840 miles of general coastline.
- According to the Legislative Analyst's Office February 2006 report, (www.lao.ca.gov/analysis_2006/2006_pandi/pi_02_anl06.html#Perspectives%20on%20the%20Economy%20and%30Demographics), California's total population will rise from an estimated 37.5 million in 2006 to 38 million in 2007 and 38.5 million in 2008.
- According to the U.S. Census Bureau (see <http://quickfacts.census.gov/qfd/states/060001k.html> and www.census.gov/population/projections/SummaryTabA1.pdf), California's population is expected to increase to 46,444,861 by July 1, 2030.
- From an integrated waste management perspective, an increasing population likely means more waste to manage over time.
- California has more than 500 jurisdictions (incorporated cities and unincorporated counties).
- These jurisdictions range in population from less than 100 to more than 4.6 million.
- Some jurisdictions are mostly industrial while others are mostly residential.
- California's characteristics impact many public policies, including those related to integrated waste management.

California integrated waste management history

- The California Integrated Waste Management Board provides a history of law (www.ciwmb.ca.gov/Statutes/Legislation/CalHist/) relating to integrated waste management. This includes highlights of significant legislation enacted in California from 1927 through 2005.

Agricultural plastic films

This is the second in a series of articles bringing you more information on the expansion of plastic film diversion opportunities and programs for local government, industry, businesses, environmental stakeholders, and the general public.

This article provides information on the composition of agricultural plastic films, its uses, and its disposal. Highlighted are the challenges and opportunities for recycling and the solutions being developed by several jurisdictions with assistance from the California Integrated Waste Management Board (CIWMB). In addition, look for information in this article on the plastic film studies the CIWMB is conducting with two California universities.

Composition of agricultural plastic films

The CIWMB's *2004 Statewide Waste Characterization Study* (www.ciwmb.ca.gov/WasteChar/WasteStudies.htm#2004) determined that approximately 90,000 tons of plastic film products (including agricultural film) is disposed in California's solid waste landfills every year. Based on information the CIWMB is receiving from various counties, agricultural film makes up 2–3 percent of the disposed waste in the rural parts of California. Plastic film products are increasing in use by all agricultural sectors (for example, dairy farming and annual crop production). These products

are replacing products made of other materials because the plastic film products usually cost less and can increase production efficiency.

How is plastic used in agriculture?

The term "Agricultural Plastics" is used to collectively refer to any film and flexible or rigid plastics used in the agricultural community on their fields. The plastic products are made of a variety of resins and are generally categorized by use, not resin type. Information on the uses of film and flexible plastic products are below:

Film and flexible plastics

- **Fumigation Film** is generally made of clear Low Density Polyethylene (LDPE). Large sheets of this material are used for fumigating fields. The film is laid flat over the acreage, placing glue at the seams to keep the film together. The farmers fumigate the field for nine days and then remove the film immediately after the ninth day. The majority of strawberry fields are treated with fumigants.
- **Mulch Film** is colored, made of LDPE or High Density Polyethylene (HDPE) and used to keep weeds away. Farmers use this film for 100 percent of strawberries grown and for some bell peppers and chili peppers grown. The film ranges from .5–1.5 mil in thickness. Mulch films estimated use is for one or two growing cycles per year.

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- **Drip Tape** is made of HDPE with a mix of Polypropylene (PP) and is used for field irrigation, particularly on annual crops. Drip tape averages 5/8"–7/8" wide and between 5–10 mil thick. The tape is used on all strawberry, bell pepper, and chili pepper crops and on a percentage of vegetable crops. In some cases, such as with strawberries, the drip tape is removed after one growing season; in other cases the tape can be reused for two to four years.
 - **Hoop House Plastic** refers to the layer of agricultural plastic film made of LDPE that is placed over a hoop to cover cane berries and some cut flower crops. This practice is used to improve production per acre and reduce the risk of crop loss from rains. Generally hoop houses are 15 feet tall at peak, approximately 20 feet wide, 300 feet long, and 4–6 mil thick. The plastic film covering is changed every three to seven years, depending on the crop being grown. No glue strips are used on greenhouse film.
 - **Silage (Feed) Bags** are made of LDPE and are used as an alternative to silos and bunkers to cover silage or feed for livestock on the ground. Silage bags are generally used once and remain out in the field to cover silage for extended periods of time.
 - **Baling Twine** is made of PP and used to bind "bales" such as hay and alfalfa. Baling twine is generally used once and remains throughout the life of the bale.
 - **Woven Sacks and Tarps** such as shade cover are made of PP or a mix of resins. Shade cloth/cover is part of the waste stream generated by nurseries. This material is made out of PP and HDPE and is usually discarded after eight to ten years.
- The agricultural community uses other more rigid plastic products, which create a source of postconsumer material for recycling and reprocessing. Information on the uses of rigid plastic products is below:

Rigid plastics

- **Drip Tubing** is made of HDPE and some PP and is used for irrigating fields, particularly permanent crops such as grapes, fruit trees, and blueberries. In such cases it is generally used for 10–25 years before being replaced, when the crop is removed.
- **Pesticide Buckets or Containers** are usually made of HDPE. They may also have metal handles and are used by virtually all agricultural operations or their contracted pest control advisors.

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*CIWMB
conducts
plastic film
studies—See
page 16 for
details.*

- **Nursery Trays (Flats) and Pots** are for the most part made of polystyrene (PS) and PP. Some nursery pots are made of HDPE. In many cases nursery pots are made of mixed resins, making it difficult to recycle them. Nursery flats can be reused multiple times in some cases, but generally pots are used once or twice and discarded to reduce the spread of disease and pest infestation.

Disposal of agricultural plastic films

Improper disposal of the products at the end of their usefulness at an agricultural site may lead to environmental degradation. Burning of material to reduce volume before burial on-site has been reported, though burning is prohibited in California. More commonly, material is dumped, stockpiled, or buried and isn't hauled off-site for disposal.

The resulting debris creates a mosquito-breeding habitat, creates choking hazards for livestock and wildlife, blocks water channels, and in general is aesthetically unpleasant.

Even proper disposal of agricultural films may lead to problems for landfill operators. Agricultural films tend to wrap around the heavy equipment, causing downtime. Due to the material properties of plastic (particularly plastic films), the products do not compact well.

As a result, most landfills operating in California, which accept agricultural plastic films for

disposal, charge a special handling fee or surcharge for problem materials. Additionally, there are several landfills that will not accept agricultural plastic films for disposal.

Agricultural plastic film products at the end of their usefulness represent a potential source of feedstock for plastics processors.

Counties implementing agricultural plastic film collection projects

Collection projects to increase diversion of agricultural plastic film products are under development. Below are some counties implementing these collection projects:

- Imperial.
- San Benito.
- Santa Cruz.
- San Luis Obispo.
- Monterey.
- Tulare.
- Ventura.

Imperial County

Imperial County (www.co.imperial.ca.us/) extends more than 4,597 square miles, bordering on Mexico to the south, Riverside County to the north, San Diego County on the west, and the State of Arizona on the east. The terrain varies from 235 feet below sea level at the Salton Sea to 4,548 feet at Blue Angel Peak.

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Agricultural plastic films, continued from page 11

According to the *Summary of California County Agriculture Commissioners' Reports 2004–2005* (www.nass.usda.gov/ca/bul/agcom/indexcav.htm), cattle, alfalfa, and leaf lettuce were the top three gross value agricultural commodities produced in Imperial County in 2005. Other crops include carrots, other lettuce, livestock, broccoli, onions, sugar beets, and sudan grass hay. Various types of plastic films and rigid plastics are used with all of these agricultural commodities.

Agri-Plas Inc., which specializes in agricultural plastics recycling, has been collecting agricultural plastic for at least 13 years. Agri-Plas, Inc. processes a large range of agricultural plastics and services the agricultural industry in ten southern and central California counties, including Imperial.

More information on Agri-Plas, Inc. may be found at www.epa.gov/epaoswer/non-hw/green/projects/agriplas.htm. In addition, Imperial County is beginning to look at other opportunities to divert agricultural plastics.

Recycling Market Development Zone (RMDZ) collaboration

The CIWMB RMDZ program combines recycling with economic development to fuel new businesses, expand existing ones, create jobs, and divert waste from landfills. As part of the RMDZ program, the CIWMB offers resources to both businesses and the local RMDZ program

administrators for stimulating markets for recyclables.

CIWMB staff and RMDZ administrators are working together to share information throughout the state regarding the need for agricultural plastic film recycling. More information about the programs available throughout the state is available at www.ciwmb.ca.gov/RMDZ/.

Central Coast RMDZ—San Benito, Santa Cruz, San Luis Obispo, and Monterey Counties

The Central Coast RMDZ (CCRMDZ) (www.ciwmb.ca.gov/RMDZ/CentralCoast/) covers 8,000 square miles, borders the Pacific Ocean, and lies between the major metropolitan centers of San Francisco/San Jose and Los Angeles. The RMDZ encompasses the counties of San Benito, Santa Cruz, San Luis Obispo, and Monterey, including the incorporated cities in all four counties.

The number one priority of CCRMDZ is agricultural film recovery. In their view, a washing/sorting facility is essential for any effective and comprehensive film recovery effort in this area. Since 2004, the local government staff involved with the CCRMDZ has met with representatives of numerous plastic film recovery businesses interested in setting up a washing/sorting facility.

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The local government staff provided these prospective businesses with data on quantities, sources, and existing collectors of agricultural plastic film. In addition, local government staff worked closely with CIWMB staff to achieve mutual plastic film recycling goals.

In particular, staff members from Salinas Valley Solid Waste Authority and Santa Cruz County Department of Public Works have been developing pilot diversion projects, acting as the main points of contact with CIWMB staff.

They are investigating the possibility of a consolidation point for the plastic films at the landfills and working with plastics recyclers to pick up material directly from agricultural businesses. For example, in 2006, material that would have normally gone to disposal was diverted by Universal Plastics. Universal Plastics recycled 120,000 pounds of drip tape from one business in Monterey County.

In June 2006, the CCRMDZ retained a consulting firm to conduct an inventory of agricultural film quantities, sources, and collectors in the central coast region. CCRMDZ shared with the CIWMB the results of the study report, *An Inventory of Agricultural Film Plastics for the Central Coast Recycling Market Development Zone*. The report is available at www.recycleloan.org/CCRMDZ%20Ag%20Film%20Inventory.pdf.

The report provides key information for any film recycling

business looking at the central coast. The report:

- 1) Provides reliable estimates on the annual quantity of each of the types of plastic film generated, diverted, and disposed within the CCRMDZ.
- 2) Documents existing material flow pathways for use, disposal, and diversion (including estimating existing feedstock presently under contract).
- 3) Makes recommendations for the most effective methods to capture plastic films and get them to a washing and/or recovery/reuse facility.
- 4) Provides information that will facilitate the siting of a plastic film washing and/or recovery/reuse facility in the central coast region.

The local jurisdiction contacts who are members of the CCRMDZ have been participating in the collaborative process with the CIWMB to increase the diversion of plastic films since the initial meetings in 2004.

The CCRMDZ will continue to participate and contribute by sharing of information and resources when possible. They have found the process to be invaluable to their efforts to site a washline in the Central Coast Zone. More information on the CCRMDZ is available at www.recycleloan.org/.

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Greater South San Joaquin Valley RMDZ— Tulare County

The Greater South San Joaquin Valley RMDZ (SJVRMDZ) (www.ciwmb.ca.gov/RMDZ/SoSanJoaquin/) lies in the heart of California's Central Valley between Fresno and Bakersfield and is located within Kings and Tulare counties. The SJVRMDZ encompasses unincorporated areas as well as the incorporated cities of Corcoran, Dinuba, Hanford, Lemoore, Porterville, Tulare, Lindsay, Farmersville, Exeter, Woodlake, and Visalia.

Staff from the Tulare County Redevelopment Agency (TCRA) has been working with CIWMB staff on agricultural plastic film projects. TCRA serves as the main point of contact for agricultural plastic film diversion projects in the region.

TCRA staff developed a pilot drop-off opportunity for the agricultural community. The county operates three landfills and seven transfer stations. Over the past several months, staff from the TCRA has been working to develop consolidation points or drop-off locations at the county-owned facilities.

This is part of a project to determine the amounts of various agricultural plastics available for recycling. The agricultural plastics transferred to the pilot project sorting/testing site are being evaluated and recycled by Viscotec.

Viscotec, a plastics recycling and processing company, is working with the TCRA to site a granule producing recycling plant at a county-owned airport (Sequoia Field) that is under redevelopment. The county's goal is to transform Sequoia Field Airport into a sustainable part of Tulare County.

Ventura County RMDZ

The entire County of Ventura (population nearly 800,000) is designated as an RMDZ (www.ciwmb.ca.gov/RMDZ/Ventura/). The cities of Camarillo, Fillmore, Moorpark, Ojai, Oxnard, Port Hueneme, San Buenaventura, Santa Paula, Simi Valley, and Thousand Oaks, including all unincorporated areas, comprise the Ventura County RMDZ (VCRMDZ). Ventura County consists of 1,198,779 acres, including 15,000 acres of industrially zoned land, and overlaps a Foreign Trade Zone. The county is also adjacent to Los Angeles, providing access to large urban markets as well as sources of materials for manufacturing.

Camarillo factory recycles agricultural plastic film

Following a grand opening in November, ENO Plastics began recycling used agricultural plastic film at its factory in Camarillo. The company turns this agricultural industry waste into flakes and pellets of low-density-polyethylene (LDPE). The washed and processed LDPE is then used by domestic manufacturers, including

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Agricultural plastic films, continued from page 14

local companies such as Marplast in Moorpark, to make new plastic products.

The recruitment of ENO Plastics to Ventura County involved a variety of assistance provided by the VCRMDZ. The main form of assistance was a \$912,000 low-interest RMDZ loan from the CIWMB. VCRMDZ staff also assisted ENO with site selection, permitting, obtaining feedstock, and forming local partnerships.

ENO found many local partners in Ventura County. For example, the Farm Bureau's Executive Director, Rex Laird, spoke at the Camarillo City Planning Commission on behalf of the project. Because some commissioners were concerned about potential negative agricultural aspects of the project, Mr. Laird provided information on issues such as the unlikely potential for residual contaminants from the fields.

Zach Xu, one of the owners of ENO Plastics, attributes the success of his venture to innovations in the extensive washing system that cleans the plastic film. When agricultural film plastic comes off the fields, it sometimes contains 60 percent dirt (by weight, not volume). ENO uses several sequential processes, including friction washing and floatation/separation. All water is re-circulated and treated before discharge to the sewer system.

Ventura County farmers grow several crops requiring the use of plastic film. These crops include strawberries, raspberries, peppers,

tomatoes, and flowers.

Applications of the plastic include hoop houses, fumigation film, mulch film, and ground cover. More than 5,000 tons of the film material is used annually in Ventura County for a variety of purposes, ranging from wind protection to keeping berries off wet ground.

ENO's recycling conserves limited natural resources and will create a total of 30 new jobs. Recycling agricultural plastic film is also important as it is a voluminous waste that can take up local landfill space, hastening the day when Ventura County's trash may have to be trucked or rail-hauled to distant and probably far more expensive landfills.

In the past year, exporters also developed new options for recycling agricultural plastic film. However, local recycling has certain advantages over export, even when export markets improve. These advantages include local job creation, lower transport costs, and recycling under conditions that meet American labor and environmental standards. Additionally, export options are less reliable than domestic recycling.

Export of agricultural plastic film is less reliable than local recycling in part due to the Basel Convention (www.basel.int/), an international treaty designed to prohibit dumping of waste from developed nations onto the developing world.

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*Stay-tuned
for an article
on new
plastic bag
legislation in
an upcoming
edition of
infoCycling.*

When agricultural plastic film is very dirty or contaminated, or the market value of plastic is low, the material can have a negative value and can be considered a waste that is being dumped. This uncertainty is just one example of the instability inherent in export markets.

Farmers are attuned to the importance of market stability due to their experiences in exporting farm products and therefore appreciate a stable, local market. Farmers have long been eager for an opportunity to recycle this material in a cost-effective manner. A local recycling factory for the material seems to meet this important community need.

Let us know

If a jurisdiction is considering development of a collection program for agricultural plastics or has already developed a program, please contact your OLA representative for technical assistance and information-sharing purposes. A list of OLA representatives is available at www.ciwmb.ca.gov/OLA/Contacts.asp.

CIWMB conducts plastic film studies

Cal Poly University San Luis Obispo Agricultural Film Infrastructure Study

As previously mentioned, the CIWMB's 2004 Statewide Waste Characterization Study determined that approximately 90,000 tons of plastic film products, which includes agricultural film, is disposed in California's solid waste

landfills every year. However, the CIWMB believes that the amount of the film generated for use in agricultural applications may be significantly greater than the disposal data indicates.

Therefore, the CIWMB is conducting a study through a contract with Cal Poly University San Luis Obispo. The objective is to develop a baseline estimate of how much agricultural plastic film is used by California agribusinesses on a regional and agricultural product basis. This study will also analyze the feasibility of different recycling options for agricultural film. A final report is anticipated by July 2007.

University of California Los Angeles (UCLA) Agricultural Film Pulling Study

The cost and efficiency of current agricultural film pulling technologies is an important topic of interest to the CIWMB. There are currently a few businesses or individuals using automated equipment to pull agricultural film, but there are also many growers using manual labor to pull agricultural film from their fields. Current plastic film pulling methods remove a large amount of soil from the field, removing valuable topsoil from agricultural lands.

Dirty film creates waste water management problems at the washing facility. In addition, this current pulling practice may not

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Agricultural plastic films, continued from page 16

adequately compact the film. Loosely compacted film makes transportation of the material expensive. Finally, widespread use of best management practices to ensure proper handling of agricultural plastic film at the end of its life are not apparently available.

In order to meet the significant market demand for this plastic film, new and improved technologies and equipment are needed to successfully pull agricultural film in a more suitable condition for transport, washing, and processing.

Therefore, the CIWMB allocated funds in a study with UCLA to identify proper techniques. The study examined development of new and improved pulling equipment for collecting and recycling the diverse types of plastic films used in growing a wide variety of crops. A final

report is anticipated by December 2007.

For more information on the plastic film studies, contact Neal Johnson at (916) 341-6513 or njohnson@ciwmb.ca.gov.

What's next?

The third article in this series of articles will focus on new legislation, AB 2449, requiring grocery and retail stores to provide plastic bags recycling programs to the public.

If you would like more information on any of the projects being implemented, please contact Melissa Vargas at (916) 341-6271 or mvargas@ciwmb.ca.gov, or contact your OLA representative. A list of OLA representatives is available at www.ciwmb.ca.gov/OLA/Contacts.asp.

Nothing in the article is intended to be an endorsement of a particular company or process by the CIWMB.

Editor's note

I hope you enjoyed this edition of *infoCycling*. In the spring 2007 edition, look for an article on detailed characterization of commercial self-haul and drop-box waste. Please contact me with suggestions on articles you would like to see included in *infoCycling* and announcements of events in your jurisdiction or at your State agency. You can e-mail me at twebb@ciwmb.ca.gov or reach me at (916) 341-6241.

Your comments and suggestions on *infoCycling* are always welcome!

Tracy